### NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE: \_\_\_\_\_\_\_ PER. \_\_\_

### How Does Exercise Affect Cellular Respiration Lab:

**BACKGROUND**

When you exercise, your muscles must go through cellular respiration in order to make the ATP necessary for exercise to continue. Remember that when you first start to exercise, the available ATP is used up and ATP is made rapidly by lactic acid fermentation. Lactic acid is what causes your muscles to be sore and is the reason you stretch (to get rid of lactic acid fermentation). After a period of time, aerobic cellular respiration kicks in. This is when you need oxygen and glucose in order to produce the ATP necessary to continue. Remember the products of cellular respiration are CO2 and H2O. So, when you exercise you produce more carbon dioxide the longer you exercise because of cellular respiration.

**INTRODUCTION**

In this lab you will investigate how exercise affects cellular respiration by using bromothymol blue solution, a straw and a stop watch to compare your carbon dioxide production before and after a certain amount of time exercising.

Bromothymol blue (BTB) solution is an indicator which turns yellow in the prescence of carbon dioxide and turns blue in the presence of oxygen.

**PROBLEM** Identify the problem for this lab. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**PRE LAB**

1. What is the independent variable in this lab?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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2. What is the dependent variable in this lab? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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3. What is/are the control(s) in this lab? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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4. What color will BTB turn when CO2 is added? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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5. What is the first step of cellular respiration? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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6. What is meant by “aerobic”? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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7. What is meant by anaerobic? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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8. What is the balanced equationf or cellular respiration? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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9. What molecule is made by cellular respiration? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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10. What is your hypothesis for this lab? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**MATERIALS:**

2 small test tubes bromothymol blue solution

Paper Labeling Test tubes “A” and “B” A straw for each partner

10mL Graduated Cylinder Clock

**PROCEDURE:**

1. Using a wax pencil, label two test tubes A & B.

2. Add 10mL of water with a 10 drops of bromothymol blue solution to each test tube.

3. Slowly exhale into tube A through a straw

a. Your partner should time how long it takes for a color change “at rest”.

b. Record this time in Data Table 1 (Remember to make a title for your table)

4. Wait for me to begin the time for exercising.

5. Do as many jumping jacks as you can for 4 minutes.

6. Once the 4 minutes is up, exhale through a straw into tube B.

a. Your partner will time how long it takes for a color change “after 4 minutes of exercise”.

b. Record this time in Data Table 1

7. Trade roles with your partner and repeat steps 3-6.

**RESULTS**

|  |  |  |
| --- | --- | --- |
|  | **TIME FOR BTB TO CHANGE COLOR (S)** | |
| **NAME** | **AT REST** | **AFTER 4 MINS OF EXERCISE** |
|  |  |  |
|  |  |  |

**TABLE 1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**Conclusion**

1. How did exercise affect the time for the solution to change color?

2. What process in your body produces carbon dioxide?

3. How does exercise affect this process?

4. Was your hypothesis supported or not, Why or why not ?

5. What is the chemical equation for cellular respiration?

6. On this paper, write a paragraph (NEATLY) explaining the different ways in which your body generates ATP when exercising. How long should you exercise aerobically each time that you exercise if you want to control your weight. (Use other resources to help you answer this question).